BIOMEDICAL ENGINEERING

OVERVIEW
Department website: https://www.uvm.edu/cems (https://www.uvm.edu/cems/)

OVERVIEW
Leveraging strong ties between the University of Vermont’s College of Engineering and Mathematical Sciences and the Larner College of Medicine, the new Master of Science in Biomedical Engineering (MSBME) was created to give students the opportunity to develop advanced skills so that they may apply engineering methods to address problems related to human health. Students enrolled in the MS in BME program will have the opportunity to pursue a research-oriented thesis based, project-based or coursework based program.

DEGREES
Biomedical Engineering AMP (http://catalogue.uvm.edu/graduate/biomedicalengineering/biomedicalengineeringamp/)
Biomedical Engineering M.S. (http://catalogue.uvm.edu/graduate/biomedicalengineering/biomedicalengineeringms/)
Biomedical Engineering Ph.D. (http://catalogue.uvm.edu/graduate/biomedicalengineering/biomedicalengineeringphd/)

FACULTY
Bates, Jason H. T.; Professor, Department of Medicine-Pulmonary; DSC, Canterbury University; PHD, University of Otago
Berger, Christopher Lewis; Professor, Department of Molecular Physiology and Biophysics; PHD, University of Minnesota Twin Cities
Beynnon, Bruce David; Professor, Department of Orthopaedics and Rehabilitation; PHD, University of Vermont
Cipolla, Marilyn Jo; Professor, Department of Neurological Sciences; PHD, University of Vermont
Doiron, Amber; Assistant Professor, Department of Electrical and Biomedical Engineering; PHD, University of Texas at Austin
Dubief, Yves C.; Associate Professor, Department of Mechanical Engineering; PHD, Institut National Polytechnique de Grenoble
Fiorentino, Niccolo M.; Assistant Professor, Department of Mechanical Engineering; PHD, University of Virginia
Jangraw, David; Assistant Professor, Department of Biomedical Engineering, Ph. D, Columbia University
McGinnis, Ryan S.; Assistant Professor, Department of Electrical and Biomedical Engineering; DPHIL, University of Michigan
Oldinski-Floreani, Rachael Ann; Associate Professor, Department of Mechanical Engineering; PHD, Colorado State University
Rizzo, Donna Marie; Professor, Department of Civil and Environmental Engineering; PHD, University of Vermont
Spector, Peter Salem; Professor, Department of Medicine-Cardiology; MD, Albert Einstein College of Medicine
Warshaw, David; Professor, Department of Molecular Physiology and Biophysics; PHD, University of Vermont
Weiss, Daniel; Professor, Department of Medicine-Pulmonary; MD, PHD, Mount Sinai School of Medicine

Courses
BME 206. Biomechanics of Human Motion. 3 Credits.
Biomechanics of Human Motion will describe the typical processes-from small scale protein interactions to large scale joint torques-that result in human locomotion. Clinical problems and athletic performance will be discussed. Students will learn about musculoskeletal tissues related to force generation/transmission and will perform kinematic/kinetic analyses. Prerequisite: Senior or Graduate student standing in Engineering. Instructor permission. Cross-listed with: ME 206.

BME 227. Biomedical Instrumentation. 3 Credits.
Measurement techniques for biomedical engineering research and industry, and health care institutions. Integrated biomedical monitoring, diagnostic, and therapeutic instrumentation. Prerequisite: EE 100 or EE 004 or EE 075 or EE 021. Co-requisite: EE 120, ANPS 020, or Instructor permission. Cross-listed with: EE 227.

BME 240. Wearable Sensing. 3 Credits.
Covers current state-of-the-art in wearable sensors and the biomechanical and physiological phenomena they are being used to measure. Emphasis will be given to applications related to human health and medicine. Prerequisite: ME 111 or EE 171 or equivalent with Instructor permission.

BME 241. Biomedical Signal Processing. 3 Credits.
Covers several important physiological signals often monitored in biomedical contexts (e.g. EMG, ECG, PPG). Content will include the physiology that generates the signals as well as the signal processing techniques (e.g., LTI filters, empirical mode and wavelet decomposition) and algorithms used for analysis. Prerequisite: ME 111 or EE 171 or equivalent with Instructor permission.

BME 250. Nanobiomaterials. 3 Credits.
Covers the classes of nanomaterials used biomedically, the biological response, and material testing. Content includes applications of nanomaterials in drug delivery, nano-topography of surfaces, sensors, and imaging as well as the topic of nanotoxicity. Prerequisite: ME 101 or equivalent with instructor permission.

BME 391. Master’s Thesis Research. 1-18 Credits.
Credit as arranged.

BME 393. Graduate Seminar. 1 Credit.
Presentation and discussion of advanced problems, research, and current topics in Electrical Engineering by faculty, graduate students, and outside guest speakers. Prerequisite: Graduate Student standing.

BME 396. Advanced Special Topics. 1-18 Credits.
See Schedule of Courses for specific titles.
BME 491. Dissertation Research. 1-18 Credits.

BME 492. Independent Study. 1-18 Credits.
A course which is tailored to fit the interests of a specific student, which occurs outside the traditional classroom/laboratory setting under the supervision of a faculty member, for which credit is awarded. Offered at department discretion.

BME 496. Advanced Special Topics. 1-18 Credits.
See Schedule of Courses for specific titles.